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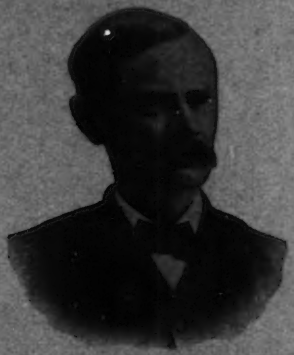
JANUARY, 1932

ENTOMOLOGICAL NEWS

Vol. XLIII No. 1



JOHN HENRY COMSTOCK, 1849-1931.
Portrait of 1884.

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ENTOMOLOGICAL NEWS

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Notes on a Collecting Spot in France and a Chalcid Larva (Stilbula cynipiformis Rossi). (Hymenop.: Eucharidae).

By H. L. PARKER, U. S. Bureau of Entomology.

High in the Gapeau Valley near the old convent of Montrieux before the clear waters of this stream come out on to the plains below Soliès Ville—where they are sopped up by the thirsty irrigation ditches—they jump along through shady lanes for several miles. Here and there cold springs rush out from the moss and ivy-covered banks to join the passing waters on their downward journey.

At a certain point which I well know, having visited it many times, there is a small plain where the narrow valley tries to widen out but is prevented by the tree-covered hills. It lies snug at the foot of the steep hills on one side and close against the river on the other, and the river lies close to the opposite hill.

Along the banks of the stream, even in August, all things are fresh and cool. The moss is soft, the ferns are rank, and the ivy twists around every trunk Ten yards farther out there are dogwood bushes, wild plums, roses and brambles, clematis and small oaks with a carpet of grass tufts thrown in carelessly among them. Farther away from the stream by twenty yards the carpet changes to a thick layer of spiny genet in order to hide the ragged edges of the limestones which have lain in their beds for a thousand years. Here the Spanish broom and the spiny calycotome hold their usual lordly place among the macquis and over the whole is the vague dryish provençale enchantment of mid-summer. Moving from the banks of the stream to the foot of the hill is like passing from one clime to another. Here the dragonflies play and coveys of small moths rise from the ferns, there the cigales sing praises to the heat and the great "eyed" lizard* suns itself on the Spanish broom,

To say that this spot is a collector's paradise would be somewhat of an exaggeration. It is a good collecting place for a student in any order. Beetles and bugs abound, moths and caterpillars are everywhere. The big tents of the pine processionary dot the plain and their nests are full of parasites, the dogwood leaves hide *Iponomeuta* and she in turn is host to thousands of chalcids. The dead limbs are full of *Xylocopa* nests abounding in cocoons of the rare *Polochrum* parasite. Two species of bumble bees have their nests in spots which I well know, the undersides of the limestone rocks are thick with wasp nests, and their holes and crevices bear colonies of sympathetic little *Leptothorax*. *Formica*[1] nests are as high as my knee and large areas are roped off for use by the ferocious *Camponotus*[2] while their cousins, the dark-loving *aethiops*, have built themselves mud nests in the midst of every grass tuft or beside every stone. The closer I look the smaller they become. Here is the little *Pheidole pallidula*, its tiny neighbors *Plagiolepis pygmaea, Tetramorium caespitum*, and minute *Solenopsis fugax* and their nests abound in inquilines[3] and strange-built proctotrypids.

Here then is a fine spot, and it is good to work here and to browse here and to sit here and think, but it is better still to sit here and do nothing. Here at dusk of a summer's evening I can hear the distant axes of the charcoal burners and bark takers, I can hear the twelve Chartreux monks, first to come from their long exile home to their monastery high on the hillside, chant with lusty lungs their praises to the friendly forests of pine and cork oak.

But back to the plain; if I have wandered away from the subject I have not wandered from the plain and for the balance of this harangue we must keep in the second zone about fifteen yards from the stream until we finish our work there, when we adjourn to the microscope.

Here, if I go under the bushes and brambles, and open one

* *L. ocellata* sometimes attains the length of 2¼ feet.
[1] *F. rufa.*
[2] *cruentatus.*
[3] *Solenopsis imitatrix* Wasm. (et al).

of the mud nests of *C. aethiops* at this time of year, I will most certainly find cocoons in abundance in the burrows and chambers near the top of the nest. I must be quick to gather them, however, else the population will seize upon them and disappear into the darkness below.

Upon examining the cocoons I find that they are of several sizes. There is, rarely, a huge one probably bearing a queen, there is a somewhat smaller one bearing wingless workers with big heads, another of about the same size bearing winged forms, probably the males, and still smaller ones bearing the smaller and more abundant workers. In some nests one variety of cocoon will be present almost to the exclusion of others such for example as small workers while in another nest most of the cocoons will be winged forms.

The rare parasite *Stilbula cynipiformis* lives as a larva in the cocoons of this ant, where it sucks the contents from the

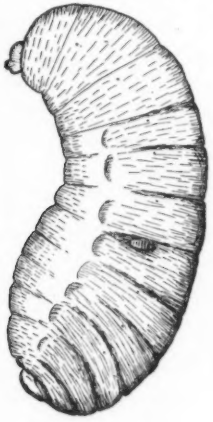


Fig. 1

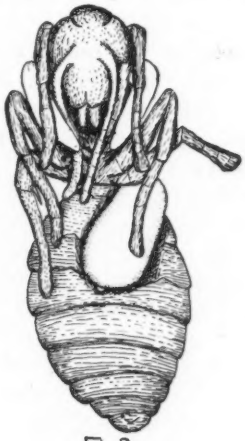


Fig. 2

bodies of the large-headed worker and the winged form. How the small larva of the *Stibula* gets into the nest is a mystery, but it does get there, for I have found it upon a larva of the ant within the cocoon. The illustration (fig. 1) shows a young larva (first stage) near the end of its feeding period, located

on the side of an ant larva. The next illustration (fig. 2) shows a larger (last stage) *Stilbula* attached in its characteristic manner to the abdomen of an ant pupa. Sometimes they are attached to the right side and sometimes to the left, but all that I have seen on pupae are attached somewhat ventrally. In this position the *Stilbula* larva completely empties the ant pupa, leaving the skin a white and useless shell.

I have given elsewhere * a description of the young *Stilbula* larva but I shall say here that it is an extremely small animal whose body is composed of a dark head with two hooked mandibles and seven brownish ringlike segments with an eighth or terminal spinous segment. So far as I can see it has no spiracles or tracheae. When this larva has stuffed itself with the juices of the ant its body becomes a thousand times more voluminous than when it hatched, and it is so bloated that the dark rings composing the segments are widely separated, owing to the stretching of the skin.

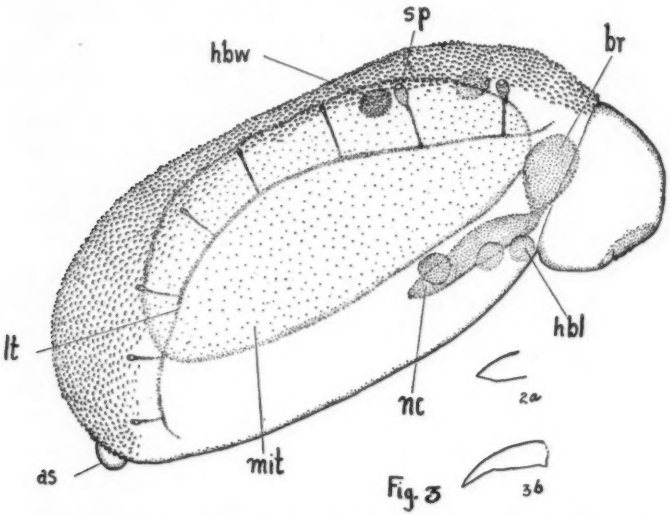
When the skin is finally shed the next-stage larva, which I have not observed except from the remains, is apparently a rather oval whitish blotch without visible segmentation. It appears to have weak mandibles (fig. 2a), some tracheae, and two pairs of spiracles as well as several transverse rows of tiny spines on the skin.

The last-stage larva (fig. 3) is a large whitish oval affair with its rather globular head bent somewhat ventrally. It is absolutely without segmentation except for the head and terminal segment, which latter is a small spherical tubercle (fig. 3 *as*). The body is soft and flabby and at no time have I ever seen a larva contract or contort its body as hymenopterous larvae often do. I have been unable even with the aid of a powerful microscope to observe the slightest sign of tegumentary muscles; and while I am not willing to affirm that there are not any, for fear there be some, I will say that if they are present they are reduced to the stage of tiny almost invisible fibres or else they have never developed beyond this stage. Whatever be the case, I can say that the larva of this animal

* Ann. Ent. Soc. Amer., Vol. XVIII, No. 3, p. 394.

is more nearly deprived of body muscles than any other Chalcid larva I have ever seen.

The head of this parasite larva is prominent enough, and is set off from the body by a slight constriction. Usually a larva of this order of insects will have certain distinguishing marks on its head such as a hard rim above the mouth, stiff cheek plates, and maxillae or else labium and sometimes antennae,



and sutures. This one has nothing except a slight depression which is the mouth and two weak mandibles (fig. 3*b*) but of the other organs there is no sign.

The back and sides for a way down are covered with small tubercles, and along each side is a row of eight open spiracles (fig. 3 *sp*) by which air is obtained, or else let out, or both; I have also observed a tracheal trunk (*lt*) on each side of the body and branches of various sizes but I can not place the bifurcations of these branches where they quit the main trunks. Inside the body I can also see the nervous system, or a part of it consisting of the brain (*br*) and a short ventral nerve chain (*nc*). There is a large stomach or mid intestine (*mit*)

filled with material, and fat lobes are present. In the head various structures can be seen as a whole but they can not very clearly be discerned separately and the same is true of the hind intestinal region. I have therefore put nothing in these areas in the drawing. In the one whole and stained specimen of *Stilbula* which I have I can not discern separately the salivary glands and malpighian tubes. The pads which will later form the legs and wings can be seen easily (*hbl, hbw*).

Thus it would appear that this insect has three larval stages. I have not observed a single individual grow from the first stage to the adult but the cast skins left by a larva during its development are invariably plastered into the skin of the ant pupa, one above the other, the smallest being near the spot where the feeding hole (and there is only one feeding hole) is located. If they are boiled and spread out in liquid gum arabic they can be pulled apart to a considerable extent and this is how I came by my present opinion.

The ants apparently do not harm the parasite but care as tenderly for the parasitized cocoon as for the other ones. The female is allowed to issue and go her way unmolested to the outer world where in late July and early August she can be found sitting on grass blades and bushes in the plain beside the upper Gapeau and often at dusk the writer also can be found sitting close by.

Duration of the Pupal Stage of Tenebrio molitor Linnaeus at Constant and at Alternating Temperatures (Coleop.: Tenebrionidae).

By Nellie M. Payne.

According to Uvarov (1931), few data exist on the effect of alternating temperatures on insect development. Therefore these results which were obtained with mealworm pupae will probably be of some interest. Temperature was controlled to within ±1 degree Centigrade. Relative humidity was controlled by drawing air through an atmosphere of definite moisture content. In the temperature chambers there was free circulation of air. Freshly formed pupae which were never

more than four hours old and generally two were used. Results obtained were as follows: The figures indicate the number of days required for pupation.

Constant Temperature			Alternating Temperature (Alternated every 24 hours)		
Temperatures	Relative Humidity 60%	40%	Temperatures	Relative Humidity 60%	40%
15°	30	33	20°, 30°	10	—
20°	14-16	—	25°, 35°	7	8
25°	9	13	15°, 25°	13	20
30°	6-7	—	15°, 30°	11	—
35°	6	7			

Pupae exposed to alternating temperatures generally developed somewhat faster than would be predicted from their development rate at constant temperatures.

LITERATURE CITED.

UVAROV, B. P. (1931) Insects and Climate—Trans. Ent. Soc. London 79: 1-247.

Biological Notes and New Records of North American Chermidae (Homoptera).

By F. D. KLYVER, San Mateo Junior College, San Mateo, California.

The writer is indebted mainly to the following individuals, to each one of whom he here wishes to express his thanks, for the material on which the following new North American Chermidae (Psyllidae) records are based: Professor G. F. Ferris, Stanford University; Dr. P. N. Annand, Sugar Beet Insect Investigations, United States Bureau of Entomology; Mr. G. F. Knowlton, Agricultural Experiment Station, Logan, Utah; Mr. V. E. Romney, United States Bureau of Entomology, Mesilla Park, N. M.; Mr. H. H. Keifer, Curator Entomology Laboratory, California State Department of Agriculture; Mr. L. E. Myers, State Plant Board, A. & M. College, Mississippi; and Dr. Carl D. Duncan, Stanford University.[1] The biological

[1] Additional new records are to be found in the following papers by the writer: Chermidae From Utah, Nevada, and Arizona, Including Three New Species: *Pan-Pacific Entomologist* 7:131-143, 157-158; January, 1931. New records and Two New Species of Chermidae from British Columbia and Washington, With Biological Notes: *Pan-Pacific Entomologist* 8:11-17, July 1931.

notes here included are, with very few exceptions, based upon field observations made by the writer in California and Nevada during the past two years.

Host Plant Relationships of the Chermidae

Since there apparently exists at the present time no definite statement of chermid host plant relationships it seems desirable to suggest the following criteria.

With very few exceptions the individual species of Chermidae have not been demonstrated to have as hosts any but closely related plant species, in the sense that a host is defined as a plant upon which the insect feeds at some stage of its existence. In the majority of cases definite proof of such feeding exists only for the nymphs, in fact, it apparently remains to be definitely proven that the adults feed at all. *Paratrioza cockerelli* is known to feed in its nymphal stages on a number of widely separated host plants.

Many chermid species have been taken as adults from an almost infinite variety of plants and these plants have been recorded as hosts, although there exists no evidence that the insects actually feed upon them, the plants perhaps serving more or less accidentally merely as shelters. For the purpose of emphasizing the biological connections, the term *host* is here restricted to plants upon which the insect is actually known to feed, as proved by the presence of the nymphs, while the expression *nominal host* is used to designate a plant from which a chermid has been taken without proof of its feeding upon that plant. Field observations indicate that the adults of certain species of chermids are found predominatingly on different plants at different times of the year. When proof is available that these adults actually feed upon different plant species, the plant upon which a chermid feeds as an adult but does not produce its young may be called an *alternate host*.

Records and Biological Notes.

Sixty species, approximately one-third of the total number considered by Crawford in his monograph of the Chermidae of North America, are here included.

LIVIA CARICIS Crawford. IDAHO.—Adults only: from unknown host, wet meadow, near Craters of the Moon, June 29, 1930 (Annand); from unknown host, Craters of the Moon, same date (Annand). UTAH.—Adults only: from unknown host, Logan, April 20, 1927 (Knowlton); from unknown host, Richmond, April 29, 1927 (Knowlton). Host: Unknown.[1] Nominal Hosts: *Carex* spp.

APHALARA CALTHAE (L.) CALIFORNIA.—Adults and nymphs: from *Polygonium ariculare,* Winters, October 22, 1929 (Annand). Nymphs only: from herbarium specimen of *P. muhlanhezei,* 8 miles from Dos Palos, May 15, 1931 (Duncan and Merson). Adults only: from *Baccharis viminea,* Corral Hollow, 10 miles southwest of Tracy, November 4, 1929 (Annand); from *Atriplex,* north of Tracy, October 12, 1929 (Annand); from pear trees, Hood, Sacramento County, April 15, 1931 (Keifer); from *Salix,* Corral Hollow, November 30, 1929[2]; from *Salix,* south of Tehachapi, Kern County, April 13, 1930. IDAHO.—Adults only: from unknown host, Ketchum, July 20, 1930 (Annand); from unknown host, Alturas Lake, Stanley Basin, July 19, 1930 (Annand).
NEW MEXICO. Adults only: from *Salsola pestifer,* 3.1 miles southeast of Mora, July 16, 1929 (Romney). UTAH.—Adults only: from weed, Hooper, October 14, 1927 (Pack: Knowlton). Host: *Polygonum.* Nominal Hosts: *Caltha palustris, Artemisia tridentata, Salsola pestifer,* cultivated tomatoes, weeds.

The nymphs occur singly on the younger growth, particularly the ventral side of the leaves, unaccompanied by conspicuous wax secretion.

APHALARA RUMICIS Mally. NOVA SCOTIA.—Adults and nymphs: from *Rumex.,* no locality data, no date (W. H. Brittain).
Host: *Rumex.* Nominal Hosts: *Rumex altissimus, Sophia pinnata.*
Biological data lacking.

APHALARA SUAEDAE Crawford. CALIFORNIA.—Adults and nymphs: from *Suaeda,* Altamont Pass, east of Livermore, October 12, 1929 (Annand); from same host, south of South Dos Palos, December 6, 1929; from same host, Altamont Pass, November 30, 1929; from unrecorded host, Visalia, October 20, 1930 (Keifer: F. T. Scott); from *Suaeda,* Salt Wells Canyon,

[1] No biological data are given for species the nymphs of which are unknown.
[2] Specimens recorded without the collector's name were collected by the writer.

Inyo County, April, 1924 (Ferris). NEVADA.—Adults and nymphs: from *Dondia intermedia* (?), Moapa Valley, 4 miles east of Glendale, April 18, 1930 (Annand). NEW MEXICO.—Adults only: from *Lepidium alyssoides,* 16.5 miles southwest of Alamogordo, July 3, 1929 (Romney); from *Artemisia wrightii,* 6 miles west of Mule Creek, August 8, 1929 (Romney). TEXAS.—Adults only: from *L. alyssoides,* 1 mile north of Almo Alto, December 13, 1930 (Romney). UTAH.—Adults only: from beets, Delta, June 24, 1927 (Knowlton).
Hosts: *Suaeda* spp. (= Dondia.) Nominal Hosts: *Lepidium, Artemisia,* beets.

The nymphs produce an abundance of white, cottony wax secretion, within which they become covered, among the younger branches. During the colder part of the year the adults may be found in this same material in a quiescent stage. A witches' broom effect in the younger growth is associated with severe attacks.

APHALARA VEAZIEI Pach. NOVA SCOTIA.—Adult only: from *Solidago,* King's County, no date (W. H. Brittain).
Host: Unknown. Nominal Host: *Solidago.*

According to Crawford, this is an exceedingly variable and widely distributed species.

APHALARA PULCHELLA Crawford. CALIFORNIA.—Adults only: from *Carex,* 3 miles west of Corral Hollow, southwest of Tracy, November 30, 1929; from *Frankenia grandifolia,* Tulare Lake Basin, 10 miles south of Corcoran, December 7, 1929; from *Prosopis juliflora* var. *glandulosa,* Corral Hollow, May 16, 1930; from *Ceanothus cuneatus,* Table Mountain, Fresno County, April 16, 1930.
Host: Unknown. Nominal Hosts: *Carex, Frankenia, Prosopis, Ceanothus.*
APHALARA GUTIERREZIAE Klyver. CALIFORNIA.—Adults only: from *Gutierrezia,* on desert foothills 10 miles from Coalingo, March 24, 1930 (Annand); from *Chrysothamnus,* Mountain Springs Canyon, Coso Mountains, April 12, 1930; same host, Red Rock Canyon, April 13, 1930. NEW MEXICO.—Adults only: from *Lepidium alyssoides,* 3 miles east of Oro Grande, August 8, 1930 (Romney); from *Salsola pestifer,* Nara Visa, July 28, 1929 (Romney).
Host: Unknown. Nominal Hosts: *Gutierrezia, Salsola, Lepidium, Chrysothamnus.*

APHALARA MARTINI Van Duzee. CALIFORNIA.—Adults and nymphs: from *Frankenia grandifolia,* Tracy, November 4, 1929 (Annand); from same host, Little Panoche Creek, west of Firebaugh, November 5, 1929 (Annand); from same host, Corcoran, November 20, 1929 (Annand); from same host, salt marsh, San Mateo Point, San Mateo, May 5, 1929; same data, May 10, 1929; same data, May 19, 1929; same data, July 2, 1929; from same host, Livermore Valley, northeast of Livermore, November 30, 1929; same host, Tulare Lake Basin, 10 miles south of Corcoran, December 7, 1929. Adults only: from *Atriplex polycarpa,* 1 mile west of Coalinga, December 7, 1929; from *Frankenia,* same locality, December 8, 1929; from *Salix,* south of Hanford, December 7, 1929.
Host: *Frankenia.* Nominal Hosts: *Atriplex, Salix.*

The nymphs are usually abundant on the ventral side of the younger leaves in which they intensify the natural revolute tendency. They are accompanied by a sticky, slightly amber-colored honey-dew. The chermid has the effect of dwarfing the younger growth.

APHALARA (ANOMOCERA) MINUTISSIMA Crawford. CALIFORNIA.—Adults only: from *Artemisia californica,* Montara, San Mateo County, April 3, 1931; from *A. tridentata,* Volcanic Tableland, north of Bishop, June 19, 1931. IDAHO.—Adults only: from unknown host, Wapi, June 24, 1930 (Annand). UTAH.—Adults only: "feeding on sugar beet", Ogden, June 9, 1927 (Knowlton).
Host: Unknown. Nominal Hosts: *Artemisia,* sugar beets.

APHALARA (ANOMOCERA) ANOMALA Crawford. NEW MEXICO.—Adults only: from *Artemisia wrightii,* 6 miles west of Mule Creek, August 8, 1929 (Romney).
Host: Unknown. Nominal Host: *Artemisia.*

APHALAROIDA PITHECOLOBIA Crawford. NEW MEXICO.—Adults only: from *Lepidium alyssoides,* Playas, August 15, 1929 (Romney). TEXAS.—Adults only: from same host, 9 miles from Fabens, June 18, 1930 (Romney).
Host: Unknown. Nominal Hosts: *Lepidium, Pithecolobium.*

PAUROCEPHALA FREMONTIAE Klyver. CALIFORNIA.—Adults and nymphs: from *Fremontia californica,* 2 miles west of Tehachapi, Kern County, April 13, 1930; from same host, 3 miles east of Onyx, South Fork of Kern River, and lower Kern River Canyon west of Bodfish, both June 19, 1931.
Host: *Fremontia californica.*

This species apparently does not become abundant. The nymphs are found on the ventral side of the leaves. The small amount of wax produced is given off in the form of long, straight, transparent, and somewhat glistening brownish threads. These threads do not intermingle to form a cottony mass.

HETEROPSYLLA TEXANA Crawford. NEW MEXICO.—Adults only: from *Lepidium alyssoides,* 10 miles south of State College, Mesilla, April 8, 1930 (Romney); from the same host, Playas, August 15, 1930; from "P-65", 10 miles north of Columbus, same date; from *Salsola pestifer,* 5.7 miles north of Gallegos, July 12, 1929; from same host, 26.6 miles northwest of Logan, same date; from same host, 1.5 miles south of Ranchos de Taos, July 16, 1929; from same host, 4.2 miles northwest of Roy, July 13, 1929; from same host, 12.7 miles west of Clayton, June 29, 1929; from same host .5 mile south of Almo, August 3, 1929; from same host, .5 mile south of Animas, August 15, 1929. TEXAS.—Adults only: from *L. alyssoides,* 9 miles south of Fabens, April 30, 1930; from same host, Sierra Blanca, June 15, 1930. All the foregoing collections by Romney.
Host: *Prosopis glandulosa.* Nominal Hosts: *Pithecolobium, Shpaeralcea angustifolia, Monarda citriodora, Chrysopsis, Tamarax gallica, Celtis pallida, Acacia, Prosopis juliflor.*

An abundant species in its range. The nymphs are very imperfectly known.

CALOPHYA TRIOZOMIMA Schwarz. IDAHO.—Adults only: from unknown host, Shoeshone Falls, July 31, 1930 (Annand).
Host: Unknown. Nominal Host: *Rhus.*

The species of this genus have been taken predominantly from sumac.

KUWAYAMA MEDICAGINIS Crawford. NEW MEXICO.—Adults only: from *Chrysothamnus,* 13 miles northwest of Bernalillo, July 20, 1929; from *Parosela,* 5 miles northwest of Bernalillo, same date; from *Trianthema portulacastrum,* 2.5 miles east of Steins, August 15, 1929; from *Chrysothamnus serrulata,* 5 miles south of Datil, August 7, 1929; from *Lepidium alyssoides,* 3 miles west of Las Cruces, November 7, 1930; from same host, 1 mile east of Mesquite, May 19, 1931; from same host, Mesilla Valley, June 9, 1930. All the foregoing collections by Romney.
Host: Unknown. Nominal Hosts: *Medicago sativa, Chrysothamnus, Parosela, Trianthema.*

(To be continued)

Nomada amorphae Swenk in Colorado (Hym.: Nomadidae).

H. G. RODECK, University of Colorado.

Nomada (*Micronomada*) *amorphae* Swenk was described[1] from specimens taken at Halsey, Nebraska, July 11, 1909, and apparently has not been recorded since then. On July 17, 1930, three specimens were taken in the sand hills north of Roggen, Colorado. Two of them (one male and one female) seem to be the same as the insect described by Swenk, differing in being slightly smaller (6 mm. as compared with 7 mm. in the type), the female having no yellow spot on the supraclypeal area and having the mesopleural and axillary spots red, and the yellow of the face-marks diluted with reddish. The male has no yellow line over the top of the eyes connecting the lateral face-marks with the oval yellow spot behind the eye, the mesopleural spot is divided, and the axillary spots are red as in the female.

The third specimen (male) is like the type in having the axillary spots yellow, but in addition to differing in the characters mentioned above has the thorax, with the exception of the mesonotum, clear red like the legs. The mesonotum is black but is marked with indistinct reddish stains. The third ventral abdominal segment has irregular yellow markings.

The original description of *N. amorphae* did not include the wing venation which, in the above specimens, is as follows: Basal nervure interstitial with the nervulus. Second submarginal cell nearly as broad above as at its base, receiving the first recurrent nervure at about the mid-point, or slightly basad of it. Third submarginal cell narrowed above to about one-third its basal breadth, its outer margin not very strongly curved. The second recurrent nervure joins the base of the third submarginal cell far beyond the mid-point of the latter.

Some Malformations Noted in Genitalia of Phyllophaga (Coleop.: Scarabaeidae).

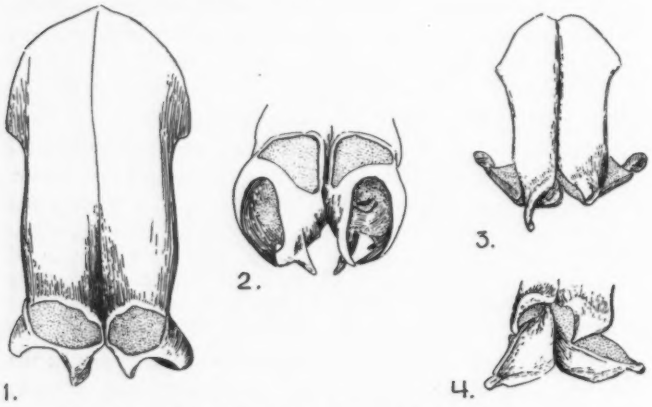
By A. R. ROLFS,

U. S. Bureau of Entomology, Yakima, Wash.

In determining a collection of *Phyllophaga* taken at Ames, Iowa in the spring of 1929, the writer noted two very interest-

[1] Swenk, M. H., University Studies, Lincoln, Nebraska, Vol. XII, No. 1, January, 1912 (Issued Jan. 20, 1913).

ing "sports". These specimens, both of them males, have malformed genital organs. In one specimen the whole organ is double while in the other only the telum is double. So far as I have been able to ascertain, this is the first record of such peculiarities occurring in *Phyllophaga*. The two species which these specimens represent are common around Ames and a number of others have been taken. I have examined many specimens including most of these species but have never found another with such peculiarity.



Figs. 1 and 2. Genitalia of Phyllophaga fusca Froel.
Figs. 3 and 4. Genitalia of Phyllophaga futilis Lec.

The first specimen, determined as *Phyllophaga fusca* Froel. (figs. 1, 2), compares with other males of this species as follows: The tela are fused on the dorsum, a slight depression and a well defined suture marking the line of fusion. The double telum is normal in length but is wider than normal by a fourth. The claspers are somewhat smaller than normal. Each pair is compressed laterally and is fastened to the telum at an angle so that the whole structure has somewhat the appearance of a Y. In the normal male of this species the claspers, designated as right and left claspers, differ somewhat in character. In this specimen the claspers resembling the right clasper of the normal male are both on the inside and those resembling

the left are both on the outside. Thus the claspers of the left side are normal as to position while those on the right are reversed in position. The posterior borders of the inside or right claspers are more sharply rounded and more slender than normally.

The second specimen, determined as *Phyllophaga futilis* Lec. (figs. 3, 4), has only the telum double with the claspers abnormal as to position and shape. The tela are only partially fused on the dorsum, a well defined depression and suture marking the line of fusion. The width of the combined tela is somewhat greater than the normal but their length is slightly less. The claspers, which in the normal male are narrowly united on the dorsum to form one solid piece, are separate. The cephalo-lateral portions, which are normally parallel to the body axis, are tipped out toward the sides and caudad so that they are at right angles to the body axis. The caudo-lateral portion of the left clasper is folded over that of the right clasper.

Both specimens are now in the writer's collection. The drawings were made by Mrs. Eleanor A. Carlin of the Bureau of Entomology.

A Melanic Female of Colias eurytheme (Lepid.: Pieridae).

By HAROLD O'BYRNE, Webster Groves, Missouri.

The yellow color prevalent in *Colias* and allied genera is an extremely unstable and variable character. Many shades of yellow and orange occur in some species, and there is in addition a special tendency toward albinism in the females. The opposite condition, melanism, is much less common, and it is almost completely restricted to the males. However, Scudder* mentions two examples of females of *Colias philodice* Godart whose wings have part of their normally yellow area obscured by black. He mentions none that are entirely black.

On August 1, 1928, a melanic female of *Colias eurytheme* Boisduval was taken by the writer in Webster Groves, Missouri. This specimen has no trace of yellow, the entire upper surface

* Scudder, S. H. The Butterflies of the Eastern United States.

being nearly black, and the outline of the black border and the pale spots within it that mark the female sex can be discerned only upon minute examination. The black spot on the fore wing can be seen, but the orange spot on the hind wing is obscured with black; it is a trifle darker than the surrounding area. The color underneath is a little paler and the hind wings and apices of the fore wings are greenish. The markings on the lower surface are normal. The pink edge, above and below, is conspicuous.

When captured, the butterfly had evidently just emerged, as its wings were still a little flabby; the appearance of the abdomen indicated that some time must elapse before oviposition could begin. For this reason no attempt was made to secure eggs. Therefore we are obliged, for the present, to remain ignorant of the genetic status of this butterfly. There is good ground for believing that the white females in this genus are Mendelian forms, but whether this is true of melanic specimens also must be left for future determination.

Notes on the Larval Stages of Melanchroia cephise (Lepid.: Geometridae).

By HARRIET A. WICKWIRE, Cortland, New York.

The Winter of 1930-1931 was an unusually cold one in Southern Florida, and our sojourn there was disappointing so far as collecting was concerned; however, we managed to obtain the following notes. On December 14, 1930, moths of *Melanchroia cephise* were collected, as they swarmed around a hedge of *Phyllanthus nivosus,* var. *roseo-pictus,* at Jupiter Island, Hobe Sound, Florida, thus giving us our ovipositing female, and our only cue to the food plant. By the 15th of December one of their number had oviposited 55 ova, and all the moths were dead.

Eggs. Date of laying, December 15; of hatching, December 23. Shape. Obovate with lengthwise ribs, laid on one side, with the micropyle on top and slightly depressed. Color. Light olive green at first, changing to deep rose color in 4 days. Oviposited. Singly or in loose clusters. Length. 1 mm.

Larvae 1st instar. Length 1½ mm. Color. Light horn color with black heads and black rings between the segments. They had horn colored tubercles with black setae radiating from their tops. The middle props were absent. Habits. The egg shells were left colorless and uneaten. During this instar the larvae ate only the parenchima of the leaves. Length of instar. 7 days. Date of 1st molt. Dec. 30, 1930.

Larvae 2nd instar. Length 5 mm. Color. Light horn with black rings between the segments, and black dorsal, lateral and substigmatal lines which form checkers with the rings. The heads were black. The tubercles and setae disappeared. Habits. At this instar they ate holes in the leaves without leaving either the veins or the fiber. Length of instar. 4 days. Date of 2nd molt. Jan. 3, 1931.

Larvae 3rd instar. Length 8 mm. Color. Yellowish white with black markings as before. The heads became reddish chestnut brown in this stage. Length of instar. 5 days. Date of 3rd molt. Jan. 8, 1931.

Larvae 4th instar. Length 12 mm. Color. The same. Habits. They ate their skins as soon as they cast them, and began eating from the edges of the leaves at this stage. They were never very active, but had the geometer trick of dropping from the leaves when disturbed. This was done by means of silken threads. Length of instar. 16 days. Date of 4th molt. Jan. 24, 1931.

Larvae 5th instar. Length 16 mm. Color. The same. Habits. One larva was much smaller than the others up to this stage but caught up with them before the next molt. This might have been caused by a lethargy, which overtook the smaller larva in an earlier stage and came upon the others later. No signs of lethargy were noticed, however, as all the larvae seemed to feed about the same and while they were never very active they were always equally so. Length of instar. 9 days. Date of 5th molt. Feb. 2, 1931.

Larvae 6th instar. Length 20 mm. Color. The same. Length of instar. 16 days. Mature larva. 35 mm. long.

First attempt to pupate occurred Feb. 18, 1931, but larva died in the attempt. No cocoon was made and apparently under natural conditions the larvae burrow and transform underground. A backward larva pupated successfully on March 22, 1931, and this was the only pupa we raised.

Pupa. 10 mm. long, rather slender, shiny dark brown. The moth never emerged.

Abnormal Antennae in Tragidion (Coleoptera: Cerambycidae).

By ORLANDO PARK, Department of Zoology, University of Illinois.

On examining a series of the cerambycid, *Tragidion armatum* Lec., a male was noted with both antennae distorted as follows:

Left antenna (Fig. 1a): First and second segments normal; third normal as to size and form but bent sharply in the distal third; fourth normal; fifth short, swollen distally and with a distinct hook-like process on the distal border. What is apparently the sixth segment is fused with the peculiar fifth, the probable line of fusion being indicated by a dotted line in the figure. This probable sixth segment is broad distally and ridged on the dorsal surface; seventh irregularly shaped with a slight swelling on the basal, mesial third and the median lateral third; probable eighth normal within the limit of specific variation; probable ninth distorted by a large irregular swelling on the basal lateral area; the probable tenth and eleventh are both normal.

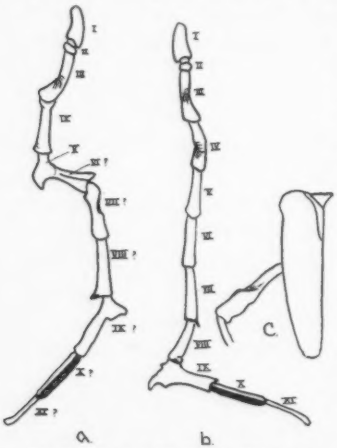


Fig. 1. Abnormality in *Tragidion armatum* Lec.: *a*, left antenna; *b*, right antenna; *c*, left elytron and meta-thoracic femur.

Right antenna (Fig. 1b): First and second segments normal; third normal as to size and form but bent broadly in the middle third; fourth as in third, but more sharply bent and slightly twisted; fifth, sixth and seventh segments normal; eighth normal save for an irregular, small swelling on the distal, mesial border; ninth highly distorted, with a large swelling on the basal third, ending in a hook-like process. Beyond this basal thickening the segment extends at right angles to articulate with the tenth. The tenth and eleventh segments are normal.

In the case treated here, we find but six segments of the left,

and seven segments of the right antenna normal, normality being determined by comparison with eighteen other individuals of the species taken at the same time. Variously distorted antennae are common in cerambycoid species (Bateson, 1894), and the formation of irregular processes from antennal segments has been touched upon by Park (1931). The abnormality of the antennae in the *armatum* under discussion is very probably a consequence of faulty pupation, or injury to the adult insect shortly after emergence from the pupal state and prior to hardening of the integument. This is strengthened by the fact that the left meta-thoracic femur was abnormally formed (Fig. 1c).

I am indebted to Mr. William J. Gerhard and to Mr. Emil Liljeblad of the Field Museum for aid in the identification of this individual. The latter was taken at Las Cruces, New Mexico, on May 20, 1931, while resting twenty feet above the ground on Yucca blooms by Mr. J. G. Keller, of the U. S. Forest Service, and is now in the collection of the writer.

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PARK, ORLANDO, 1931. Abnormal antenna in Eleodes. ENT. NEWS, 42: 112-113.

Booksellers' Reprints.

Mr. Gunder's article in the November NEWS amuses me. He evidently does not appreciate the time and trouble taken by us GRASPING bookdealers to preserve for *students* the various pamphlets which come to us in hordes and are a source of endless trouble and expense both of time and money (with catalogue costs at about $10.00 per page). Perhaps he thinks we sit up nights cutting up RARE VOLUMES of serials which are easily worth infinitely more as serials than they could possibly bring even at impossibly exorbitant prices, after dissection, for the various papers! Since the death of dear old Felix Dames (I visited him just two days before he died) I fear I am about the only book dealer who spends much time on entomological pamphlets, probably because I have entomological instincts and

"hang-overs" from my younger days, and an unlimited interest in entomological literature. Junk tries to get rid of his 15,000 papers. I have myself nearer 150,000 of them and still *buy* them and then pay out more money to catalogue them. Friedländer has even given up publishing catalogues. Try to find pamphlets at Quaritch's! My good friend Fiedler now places a $1.50 minimum price limit for items he catalogues!

"REPRINTS" is the book trade term for papers originally published in serials. I do not think that any book dealer has ever offered for sale as "authors' separates," anything except *genuine* ones, or ever led his customers to believe that mere REPRINTS were "authors' separates." I know of mighty few entomologists who collect "authors' separates": my own customers, I am sure, buy pamphlets to use, and are quite unconcerned about sentimentalities. No doubt they are glad to receive them free of charge — even though they afterwards sell them — and possibly have no objection to inscribed copies, of which, by the way, there are few in circulation in comparison with the vast number distributed by modest authors who perhaps believe that the contents of their papers are sufficiently interesting without a written signature.

There seem to be no entomologists collecting items of the Poe's "Tamerlane" class, merely as units of a book collection. If there were, they would not *bind* such pamphlets — Heavens, no!—but instead have fine morocco slip cases made in which to preserve them in exactly their original published form, unbound, not for use but for exhibition, or occasional examination and worship!—JOHN D. SHERMAN, JR., Mount Vernon, New York.

"Termite Treatment" Frauds.

Home owners should beware of overdrawn and alarming reports of injury to building by termites or white ants. In particular they should be wary when exaggerated statements of this kind form a part of the "sales talk" for a "termite treatment." Many of these treatments are expensive and are not correspondingly effective. Reports to the Bureau of Entomology indicate that sharpers, overemphasizing the real injury that termites are likely to do, are filching from home owners hundreds of thousands of dollars and rendering little or no effective service in return.

State officials and others reporting to the Bureau of Entomology reveal that the termite treatment sharpers are paricularly active in the South and in some of the Far Western States.

In these areas many cities have in recent years amended their building codes as advocated by the Bureau of Entomology and now require adequate safeguards against termites in new construction.

Salesmen, however, have been exaggerating the danger from termites in an effort to sell treatments, many of which have little or no merit, but which they picture as absolutely necessary to prevent the collapse within a short time of buildings invaded or under alleged danger of being invaded by the termites.

The Bureau of Entomology says that there has been no change in the situation in the South and West as to termite damage; that conditions are substantially the same now as they have been for the last 50 or 100 years. The records indicate that the collapse of a building on account of termite damage is so rare as to be for practical purposes a negligible risk. It is true that where termites have been in buildings for many years —as indicated by emerging swarms of the winged forms—the foundation timbers, and even the floors and adjacent woodwork, may have become so weakened as to make necessary some replacement.

The entomologists point out that an experience of 35 years in termite control indicates that radical reconstruction of the foundations is the only permanent and effective remedy for buildings which, because of original faulty construction, have become heavily infested. Such remedial measures as spraying or fumigation, or even removal of the worst infested timbers, without other protection, are at best temporary. Spraying and fumigation are practically useless.

One of the popular remedies being exploited is the spraying of woodwork with poisons. Spraying of construction timbers or other woodwork, even under a forced stream, is of no real value. The poison has little if any penetration unless the timbers are so badly eaten and rotted that they soak up the mixture like a sponge—in which case they are useless and should be replaced.

Another exploited remedy is the poisoning of soil near the foundation walls or supporting pillars underneath the buildings. All that can be said now of such treatment is that it is still very much in the experimental stage. On present information the Federal entomologists can not recommend it as a permanent remedy.

The only effective remedy for termite damage is to provide termite-proof materials for foundations. This can be done in two ways:

(1) Reconstruct the foundation walls, including cellar and cellar floors, of concrete and stone, using standard mortar; thoroughly fill all openings in masonry or tile construction; and use, where necessary, mechanical barriers, such as metal termite shields. With this protection against entry, movable woodwork placed in such basements and the woodwork of the main and upper floors can be fully and adequately protected from termite damage.

(2) Where in the construction of buildings it is desirable or necessary to use wood touching the ground or near it, this wood and all foundation timbers should be impregnated in an approved manner by one of the standard chemical wood preservatives.

These are the essentials of termite proofing in new construction. In their own interest, house owners are cautioned not to accept any new or easy methods, such as fumigation or spraying of woodwork in place, or soil poisoning, for the control or elimination of termites, until they have assured themselves of the effectiveness of the method by asking advice either from their own State Departments of Agriculture or other competent State authorities, or from the Bureau of Entomology in Washington.

U. S. Dept. of Agriculture, Office of Information.

Some Observations on the Predatory Habits of Vespula diabolica (Hymen.: Vespidae).

The benefits derived from the presence of yellow jackets, or hornets, are often overshadowed by the ill reputation and the general fear which prevails with reference to these animals. Their usefulness and importance were emphasized to the writer as he observed them capture numerous flies, *Musca domestica* being their chief victim. These flies were infesting a somewhat anemic cow who, on account of her illness, was unable to wage an effective battle against the impostors. The yellow jackets came to her rescue. One by one these wasps would swoop down on the unwary, unsuspecting fly and carry it off, presumably to the nest. The details of the performance were as follows: The wasp would overpower and with a few jabs from its sting completely paralyze its victim. A near-by wooden fence was the first stop on its journey towards its nest. Here the wasp proceeded to claim and enjoy the spoils that belong to the conqueror. The fly was firmly held between the forelegs and by means of rapid movements of the mandibles the less delectable parts, such as the wings, legs and head, were snipped off, producing a crushing, crunching sound, distinctly audible

List of the Titles of Periodicals and Serials Referred to by Numbers in Entomological Literature in Entomological News.

1. Transactions of The American Entomological Society. Philadelphia.
2. Entomologische Blätter, red. v. H. Eckstein etc. Berlin.
3. Annals of the Carnegie Museum. Pittsburgh, Pa.
4. Canadian Entomologist. London, Canada.
5. Pysche, A Journal of Entomology. Boston, Mass.
6. Journal of the New York Entomological Society. New York.
7. Annals of the Entomological Society of America. Columbus, Ohio.
8. Entomologists' Monthly Magazine. London.
9. The Entomologist. London.
10. Proceedings of the Ent. Soc. of Washington. Washington, D. C.
11. Deutsche entomologische Zeitschrift. Berlin.
12. Journal of Economic Entomology, Geneva, N. Y.
13. Journal of Entomology and Zoology. Claremont, Cal.
14. Entomologische Zeitschrift. Frankfurt a. M., Germany.
15. Natural History, American Museum of Natural History. New York.
16. American Journal of Science. New Haven, Conn.
17. Entomologische Rundschau. Stuttgart, Germany.
18. Internationale entomologische Zeitschrift. Guben, Germany.
19. Bulletin of the Brooklyn Entomological Society. Brooklyn, N. Y.
20. Societas entomologica. Stuttgart, Germany.
21. The Entomologists' Record and Journal of Variation. London.
22. Bulletin of Entomological Research. London.
23. Bollettino del Laboratorio di Zoologia generale e agraria della R. Scuola superiore d'Agricultura in Portici. Italy.
24. Annales de la société entomologique de France. Paris.
25. Bulletin de la société entomologique de France. Paris.
26. Entomologischer Anzeiger, hersg. Adolf Hoffmann. Wien, Austria.
27. Bolletino della Società Entomologica. Genova, Italy.
28. Ent. Tidskrift utgifen af Ent. Föreningen i Stockholm. Sweden.
29. Annual Report of the Ent. Society of Ontario. Toronto, Canada.
30. The Maine Naturalist. Thornaston, Maine.
31. Nature. London.
32. Boletim do Museu Nacional do Rio de Janiero. Brazil.
33. Bull. et Annales de la Société entomologique de Belgique. Bruxelles.
34. Zoologischer Anzeiger, hrsg. v. E. Korschelt. Leipzig.
35. The Annals of Applied Biology. Cambridge, England.
36. Transactions of the Entomological Society of London. England.
37. Proceedings of the Hawaiian Entomological Society. Honolulu.
38. Bull. of the Southern California Academy of Sciences. Los Angeles.
39. The Florida Entomologist. Gainesville, Fla.
40. American Museum Novitates. New York.
41. Mitteilungen der schweiz. ent. Gesellschaft. Schaffhausen, Switzerland.
42. The Journal of Experimental Zoology. Philadelphia.
43. Ohio Journal of Sciences. Columbus, Ohio.
44. Revista chileña de historia natural. Valparaiso, Chile.
45. Zeitschrift für wissenschaftliche Insektenbiologie. Berlin.
46. Zeitschrift für Morphologie und Ökologie der Tiere. Berlin.
47. Journal of Agricultural Research. Washington, D. C.
48. Wiener entomologische Zeitung. Wien, Austria.
49. Entomologische Mitteilungen. Berlin.
50. Proceedings of the U. S. National Museum. Washington, D. C.
51. Notulae entomologicae, ed. Soc. ent. helsingfors. Helsingfors, Finland.
52. Archiv für Naturgeschichte, hrsg. v. E. Strand. Berlin.

53. Quarterly Journal of Microscopical Science. London.
54. Annales de Parasitologie Humaine et Compareé. Paris.
55. Pan-Pacific Entomologist. San Francisco, Cal.
56. "Konowia". Zeit. für systematische Insektenkunde. Wien, Austria.
57. La Feuille des Naturalistes. Paris.
58. Entomologische Berichten. Nederlandsche ent. Ver. Amsterdam.
59. Encyclopédie entomologique, ed. P. Lechevalier. Paris.
60. Stettiner entomologische Zeitung. Stettin, Germany.
61. Proceedings of the California Academy of Sciences. San Francisco.
62. Bulletin of the American Museum of Natural History. New York.
63. Deutsche entomologische Zeitschrift "Iris". Berlin.
64. Zeitschrift des österr. entomologen-Vereines. Wien.
65. Zeitschrift für angewandte Entomologie, hrsg. K. Escherich. Berlin.
66. Report of the Proceedings of the Entomological Meeting. Pusa, India.
67. University of California Publications, Entomology. Berkeley, Cal.
68. Science. New York.
69. Comptes rendus hebdoma. des séances de l'Académie des sciences. Paris.
70. Entomologica Americana, Brooklyn Entomological Society. Brooklyn.
71. Novitates Zoologicae. Tring, England.
72. Revue russe d'Entomologie, Leningrad, USSR.
73. Quarterly Review of Biology. Baltimore, Maryland.
74. Sbornik entomolog. národniho musea v Praze. Prague, Czechoslavokia.
75. Annals and Magazine of Natural History. London.
76. The Scientific Monthly. New York.
77. Comptes rendus heb. des séances et mémo. de la soc. de biologie. Paris.
78. Bulletin Biologique de la France et de la Belgique. Paris.
79. Koleopterologische Rundschau. Wien.
80. Lepidopterologische Rundschau, hrsg. Adolf Hoffmann. Wien.
81. Folia myrmecol. et termitol. hrsg. Anton Krausse. Bernau bei Berlin.
82. Bulletin, Division of the Natural History Survey. Urbana, Illinois.
83. Arkiv för zoologie, K. Svenska Vetenskapsakademien i. Stockholm.
84. Ecology. Brooklyn.
85. Genetics. Princeton, New Jersey.
86. Zoologica, New York Zoological Society. New York.
87. Archiv für Entwicklungs mechanik der Organ., hrsg. v. Roux. Leipzig.
88. Die Naturwissenschaften, hrsg. A. Berliner. Berlin.
89. Zoologische Jahrbücher, hrsg. v. Spengel. Jena, Germany.
90. The American Naturalist. Garrison-on-Hudson, New York.
91. Journal of the Washington Academy of Sciences. Washington, D. C.
92. Biological Bulletin. Wood's Hole, Massachusetts.
93. Proceedings of the Zoological Society of London. England.
94. Zeitschrift für wissenschaftliche Zoologie. Leipzig.
95. Proceedings of the Biological Soc. of Washington, Washington, D. C.
96. La Cellule. Lierre, Belgium.
97. Biologisches Zentralblatt. Leipzig.
98. Le Naturaliste Canadien. Cap Rouge, Chicoutimi, Quebec.
99. Mélanges exotico-entomologiques, Par Maurice Pic. Moulins, France.
100. Bulletin Intern., Académie Polonaise des Sci. et des Lett. Cracovie, Poland.
101. Tijdschrift voor entomologie, Nederlandsche Entomol. Ver., Amsterdam.
102. Entomologiske Meddelelser, Entomologisk Forening, Copenhagen.
103. Journal of the Kansas Entomological Society, Lawrence, Kansas.
104. Revista de la Sociedad entomologica Argentina, Buenos Aires.

for a distance of four or five feet; the audibility of the sound perhaps being augmented by the vibrations set up in the wooden fence board. The entrails and the body fluids of the abdomen were eagerly consumed, leaving only the chitinous shell which was quickly rejected. The wasp then would fly off taking with it only the remaining thorax. Whether appetite or instinct was the controlling power in this act is problematical. Perhaps the rejection of the non-digestible materials reduced the weight of the body sufficiently to enable the wasp to carry its booty for a considerable distance to its nest; or perhaps the muscles of the thorax constitute the "choice cut" of the "tenderloin" of the insect carcass and as such were reserved for the precious nurslings in the nest.

A few yellow jackets, altho not the most desirable company, would do much to rid the house or premises of flies, and if left alone will do no harm. Their economic value and importance are apparent.

J. A. ELSON, Coll. of Agriculture, University of Calif.

Entomological Literature

COMPILED BY LAURA S. MACKEY UNDER THE SUPERVISION OF E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The **figures within brackets** [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual **volume**, and in some cases the part, heft, &c. the latter **within** ( ) follows; then the pagination follows the **colon** :

All continued papers, with few exceptions, are recorded only at their first installments.

*Papers containing new forms or names have an * preceding the author's name.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

☞*Note the change in the method of citing the bibliographical references, as* **explained above.**

Papers published in the Entomological News are not listed.

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OBITUARY.

The death of ANDREW GRAY WEEKS, JR., student of the Lepidoptera, on December 7, 1931, at Marion, Massachusetts, was announced in the newspapers of the following day. He was born in Boston, October 2, 1861, and received the A. B. degree from Harvard in 1883. For twenty years he was engaged in business. In 1903 he became an Honorary Associate in Entomology in the Museum of Comparative Zoology. He specialized on the diurnal Lepidoptera and among his publications was a volume entitled *Illustrations of Diurnal Lepidoptera with Descriptions,* with fine colored plates (Boston, Printed by the University Press, Cambridge, U. S. A., 1905). It contains also the itinerary of Wm. J. Gerhard (now curator of insects in the Field Museum, Chicago) in Peru and Bolivia in 1898 and 1899, who collected for Mr. Weeks in those countries.

ENTOMOLOGICAL NEWS for December, 1931, was mailed at the Philadelphia Post Office on Dec. 18, 1931.

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This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

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Exchange—Local Coleoptera offered in exchange for beetles of families Parnidae (Dyopidae) and Chrysomelidae. Particularly Parnidae and Cryptocephalini. Paul N. Musgrave, 514 Mt. Vernon Avenue, Fairmont, West Virginia.

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